CONDITION

CMV retinitis

Learn how CMV retinitis affects the retina, who is at risk, which vision changes need urgent care, and how treatment and follow-up help protect sight.

WHAT IT IS
Viral infection of the retina

BODY SYSTEM
Eyes and vision

MAIN SYMPTOMS
New floaters, blurred vision, blind spots, flashes of light

WHAT CAUSES IT
CMV reactivation with severe immune suppression

HOW IT IS DIAGNOSED
Dilated eye examination, eye fluid PCR if unclear

MAIN TREATMENT
Antiviral medicines

CAN IT BE CURED?
No, virus remains inactive for life

IS IT AN EMERGENCY?
Sometimes, with sudden major vision loss

LONG-TERM OUTLOOK
Treatment may preserve sight, but existing damage may be permanent

Overview

Cytomegalovirus, or CMV, is a common virus in the herpesvirus family. After infection, CMV usually remains inactive in the body for life. A healthy immune system normally keeps it under control.

CMV retinitis develops when the virus becomes active and infects the retina. The retina is the light-sensitive layer of tissue at the back of the eye. It sends visual information to the brain. Active infection can damage retinal tissue and nearby blood vessels.

This condition mainly affects people with severely weakened immune systems. It is most strongly associated with advanced HIV, especially when the number of CD4 immune cells is very low. It can also occur after an organ or stem cell transplant, during some cancer treatments, or in people taking medicines that strongly suppress the immune system.

CMV retinitis may begin in one eye, but the other eye can become involved if the infection is not controlled. Damage that has already occurred may be permanent. Prompt treatment can stop the infection from spreading, preserve remaining vision, and reduce the chance of disease in the other eye.

New vision symptoms in a person with major immune suppression need urgent eye assessment. Early CMV retinitis may not cause obvious symptoms, particularly when it begins in the outer part of the retina. Regular eye examinations may therefore be important for people at high risk.

Symptoms

Symptoms depend on where the infection is located and how much of the retina is affected. One eye may be affected before the other.

Possible symptoms include:

Pain and redness are not usually the main symptoms of CMV retinitis. Their absence does not rule it out.

Contact an ophthalmologist or the medical team managing your immune condition the same day if you have new floaters, blurred vision, flashes, or a new blind spot. This is especially important if you have advanced HIV, recently received a transplant, or take strong immune-suppressing medicine.

Seek emergency eye care for sudden major vision loss, a curtain or shadow moving across your sight, or a rapid increase in flashes and floaters. These symptoms can occur with retinal detachment or another urgent eye problem. If an emergency eye clinic is not available, go to an emergency department.

- New floaters, which may look like spots, threads, cobwebs, or specks moving across the field of vision
- Blurred, dim, or distorted vision
- Blind spots or missing areas of side vision
- Flashes of light
- Reduced ability to read or recognize details
- A shadow or curtain-like area in the field of vision
- Sudden or gradual loss of vision

Causes and risk factors

CMV spreads through body fluids, including saliva, urine, blood, semen, vaginal fluids, and breast milk. Many people acquire it during childhood or adulthood without realizing it. Initial infection often causes no symptoms or only a mild illness.

Afterward, CMV stays inactive in certain cells. If immune defenses become severely weakened, the virus can reactivate and travel through the bloodstream to organs such as the eyes, digestive tract, lungs, or nervous system.

Important risk factors for CMV retinitis include:

CMV retinitis became much less common among people with HIV after effective antiretroviral therapy became widely available. However, it can still develop when HIV has not yet been diagnosed, treatment has been interrupted, or treatment has not restored immune function.

CMV retinitis is uncommon in people with healthy immune systems. Other retinal conditions may resemble it, so symptoms alone cannot determine the cause.

- Advanced HIV, particularly with a CD4 count below 50 cells per cubic millimeter
- HIV that is untreated or not fully controlled
- An organ or stem cell transplant
- Blood cancers or other cancers treated with immune-suppressing therapy
- Prolonged or intensive use of corticosteroids or other medicines that weaken immune responses
- Certain inherited or acquired immune disorders

Diagnosis

An ophthalmologist, a medical doctor who specializes in eye care, usually diagnoses CMV retinitis through a dilated eye examination. Eye drops widen the pupils so the doctor can examine the retina with special lenses.

CMV often creates recognizable areas of retinal whitening, inflammation, bleeding, and damaged blood vessels. The doctor documents where the infection is located, how close it is to the macula or optic nerve, and whether the retina has begun to separate from the back of the eye. The macula is the central part of the retina needed for detailed vision.

Photographs and optical coherence tomography may help record the damage. Optical coherence tomography, or OCT, is a painless scan that creates cross-sectional images of the

retina. These images are useful for monitoring swelling and changes over time.

The appearance is often typical enough to make the diagnosis. When findings are unclear, the doctor may remove a small amount of fluid from the front or back of the eye. A laboratory can test the fluid for CMV genetic material using polymerase chain reaction, or PCR.

Blood tests may show previous CMV exposure or CMV circulating in the blood. However, a blood test alone cannot confirm or exclude CMV retinitis. The diagnosis depends mainly on examining the retina.

The care team may also check CD4 count and HIV viral load, blood cell counts, kidney function, and other signs of immune suppression. These results help guide treatment and monitor medication safety.

Treatment and management

Treatment should begin promptly after diagnosis. Management usually involves an ophthalmologist and an infectious disease or HIV specialist. Transplant or cancer specialists may also need to participate.

Treatment has two stages. Initial, or induction, treatment brings active viral replication under control. Maintenance treatment then suppresses CMV while the immune system recovers or while immune suppression continues.

Common treatment options include:

An eye injection delivers a high drug level directly to the retina, but it does not treat CMV elsewhere in the body or protect the other eye. For that reason, sight-threatening disease is often treated with both an eye injection and systemic medicine that reaches the whole body.

These medicines require close monitoring. Ganciclovir and valganciclovir can lower white blood cells, red blood cells, and platelets. Foscarnet can affect kidney function and blood levels of minerals such as calcium, magnesium, and potassium. Cidofovir can cause serious kidney injury and eye inflammation. The care team may order regular blood counts, kidney tests, and electrolyte tests.

People who could become pregnant or cause a pregnancy should ask about reproductive precautions because some anti-CMV medicines may harm a developing fetus and may affect fertility. Medication should not be stopped, changed, or shared without guidance from the treating team.

For people with HIV, effective antiretroviral therapy is essential to rebuild immune function and reduce the chance that CMV will return. National Institutes of Health guidance generally

advises starting antiretroviral therapy within one to two weeks after anti-CMV treatment begins for people who are not already taking it. The exact timing should be coordinated by the treating specialists.

As immunity improves, inflammation can sometimes develop around areas of previously treated infection. This is called immune recovery uveitis. It is not the same as uncontrolled CMV, and the treatments differ. An ophthalmologist may use corticosteroids like prednisone or hydrocortisone for significant inflammation, but steroids should not be started without specialist supervision because they can worsen an uncontrolled infection.

- Valganciclovir by mouth. The body converts this medicine into ganciclovir. It is commonly used when oral treatment is appropriate.
- Ganciclovir through a vein. Intravenous treatment may be used when disease is severe, oral medicine cannot be absorbed reliably, or another clinical issue makes hospital-based treatment preferable.
- Foscarnet through a vein. This may be considered when CMV is resistant to ganciclovir or when ganciclovir-related side effects are a concern.
- Cidofovir through a vein. This is used less often because of its potential effects on the kidneys and eyes.
- Medicine injected into the eye. An ophthalmologist may inject ganciclovir or foscarnet into the affected eye when infection is immediately threatening the macula or optic nerve.

Complications

CMV destroys retinal tissue, and vision already lost from that damage may not return. The effect on sight depends heavily on whether the infection reaches the macula, optic nerve, or a large area of the retina.

Possible complications include:

A retinal detachment occurs when the retina pulls away from the tissue supporting it. Repair usually requires an eye procedure or surgery. A new curtain-like shadow, sudden vision loss, or many new flashes and floaters requires emergency assessment.

CMV can also affect organs outside the eye, particularly in people with severe immune suppression. Systemic treatment helps reduce this risk.

- Permanent blind spots or loss of central or side vision
- Infection spreading to the other eye

- Retinal tears or retinal detachment
- Swelling in the macula
- Inflammation inside the eye
- Cataract or glaucoma related to inflammation or its treatment
- Severe visual impairment or blindness

Follow up

Frequent follow-up is part of treatment. The ophthalmologist needs to confirm that the edges of the infected area have stopped advancing and check for retinal tears, detachment, or inflammation.

NIH guidance recommends an eye examination when treatment begins, again after about two weeks, and then approximately monthly while anti-CMV treatment continues. The schedule may be more frequent for infection near the macula or optic nerve, or when symptoms change. After immune recovery, examinations are often continued at longer intervals, such as every three months.

Maintenance therapy may sometimes be stopped in a person with HIV after the retinal lesions have been inactive and the CD4 count has remained above 100 cells per cubic millimeter for at least three to six months because of effective antiretroviral therapy. This decision should be made jointly by the ophthalmologist and HIV specialist. Treatment may need to restart if immune function declines.

For transplant recipients and other people without HIV, the duration of treatment depends on the cause and expected length of immune suppression. Their transplant, cancer, or immune-disorder team should coordinate any changes to immune-suppressing medicine.

Routine appointments are appropriate when vision is stable and the care team has provided a monitoring schedule. Do not wait for the next routine appointment if new floaters, flashes, blurred vision, blind spots, or other visual changes develop.

Sources

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